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ASSESSMENT OF LIVER FUNCTION TESTS IN THE SUBJECTS VISITING PMCH HOSPITAL

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Abstract

OBJECTIVE: *This study analyzes liver function and enzyme abnormalities, highlighting demographic, lifestyle, and comorbidity impacts for informed liver disease prevention.*

METHODOLOGY: *This cross-sectional investigation was executed at PMC Hospital, Nawabshah, with the objective of evaluating hepatic function parameters and ascertaining the prevalence of hepatic function irregularities in the adult population. A total of 150 qualifying participants, aged between 18 and 65 years, were incorporated into the investigation. Clinical evaluations and laboratory analyses were conducted, encompassing the quantification of ALT, AST, ALP, GGT, bilirubin, and albumin concentrations. Data were subjected to analysis utilizing SPSS version 26.0, with statistical significance established at a p-value ≤ 0.05.*

RESULTS: *The investigation encompassed a cohort of 150 participants, with a mean age of 53.23 ± 12.94 years, comprising 52% males and 48% females. The results of the liver function tests (LFT) indicated that the average ALT concentration was 34.11 ± 14.02 U/L and the average AST concentration was 30.70 ± 9.36 U/L among the subjects, with the average ALP level recorded at 100.61 ± 25.10 U/L, the average GGT level at 43.00 ± 18.77 U/L, the average total bilirubin level at 1.01 ± 0.30 mg/dL, and the average albumin level at 4.00 ± 0.35 g/dL.*

CONCLUSION: *It is to be concluded that mild-to-moderate elevations of transaminases and cholestatic enzymes were observed in a substantial proportion. These abnormalities correlated with obesity, diabetes, and alcohol consumption. Our findings support routine LFT monitoring to detect subclinical liver injury early, inform hospital-specific reference intervals, and guide evidence-based screening. Longitudinal studies are needed to refine intervention thresholds and improve patient outcomes.*

INTRODUCTION

Liver function tests (LFTs) are one of the most valuable and commonly used laboratory diagnostic tests assessing liver health and function [1]. They consist of various biochemical markers (proteins, metabolites and enzymes) which indicate the synthetic and metabolic functions of the liver [2]. Understanding of the course of liver diseases, detection of hepatic impairment, and prescription of management is based on the interpretation of LFT results [3].

The liver performs a multitude of critical functions, encompassing metabolic processes, detoxification mechanisms, as well as the synthesis of proteins and enzymes [4]. Changes in liver enzyme tests (LFTs) parameters including bilirubin, cholestasis, AST, ALT and ALP, suggesting damage to parenchymal cells. [5] Although LFTs are commonly performed, interpretations in clinical practice are often complicated by several factors which can influence LFTs6. Such variables may include but are not limited to lifestyle diversity, medications, comorbidities, and demographics (e.g., age, gender) [7]. In addition, the interpretation of LFTs is complicated by variation in reference ranges and assay methods [8]. LFT parameters can detect a variety of hepatic disorders, ranging from simple liver disease to liver failure [9].

Liver disorders represent significant global public health burden. Such diseases are viral hepatitis, alcoholic liver disease (ALD), non-alcoholic fatty liver disease (NAFLD) and autoimmune liver diseases [10]. the abnormal patterns of LFT in community population can help identify individuals at the high risk of early diagnosis and treatment of these disorders. The LFTs are diagnostic cornerstones of liver diseases, as they provide an understanding of the pathophysiological and functional status of the liver [11]. Many factors need to be considered in interpreting LFTs data including patient's demographics, co-morbidities, drug regimens and lifestyle choices [12]. Although LFTs are widely used; there are still issues with appropriately interpreting the data because of things like confounding variables, reference range differences, and assay variability [13].This study aims to better characterize liver function test (LFT) abnormalities—including patterns, major factors and clinical outcomes—in order to enhance diagnosis, optimize management and evidence-based guidelines in patient care. With global rates of non-alcoholic fatty liver disease, alcoholic liver disease, viral hepatitis and cirrhosis increasing across ages and regions, driven by obesity, diabetes, alcohol misuse, and viral infections, systematic LFT monitoring is necessary for early detection and prompt treatment.

METHODOLOGY

A cross-sectional study was performed at PMC Hospital, Nawabshah to assess population-based reference intervals of liver function tests and the prevalence of liver function tests abnormalities in adults according to demographic, lifestyle and comorbid factors. It was a non-probability consecutive sampling method. We included all adults aged 18 to 70 of either gender with no known liver diseases (hepatitis cirrhosis etc.), other medical conditions affecting liver function, and who were willing to participate. Anyone with a history of hepato-biliary diseases (e.g., hepatitis, cirrhosis, or cholestasis), co-existing conditions (chronic kidney disease, malignancies, auto-immune disorders) or refusal were excluded from the study.

The data collected encompassed demographic information, lifestyle determinants, body mass index, and pertinent medical background. Clinical evaluations were conducted to measure vital parameters and anthropometric indices. Laboratory investigations included serum levels of ALT, AST, ALP, GGT, bilirubin, albumin, and prothrombin time to assess liver function. Additional biochemical tests, such as lipid profile, blood glucose, and hepatitis screening, were performed if indicated. All laboratory assessments were conducted by the PMC Hospital laboratory under standardized procedures. The data analyzed using the SPSS software system (Ver. 26). Descriptive statistics are shown as means ± standard deviations, and frequencies with percentages. The Chi-square test was employed to ascertain the statistical test of significance, with a significance level established at 5% to evaluate statistical relevance.

RESULTS

The mean age of 150 participants was 53.23 ± 12.94 years; their mean body mass index (BMI) was 25.75 ± 3.93 kg/m². Among the total participants, 52.0% were male and 48.0% were female. For smoking, 32.7% were smokers and 67.3% were non-smokers. Alcohol consumption was reported by 47.3% of participants, whereas 52.7% did not consume alcohol. A history of diabetes mellitus was present in 45.3% of individuals, while 54.7% were non-diabetic. Hypertension was observed in 46.0%, and 54.0% did not have hypertension. Additionally, 51.3% had hepatitis. In terms of physical activity levels, 31.3% were physically active, 34.7% had moderate activity, and 34.0% were sedentary as shown in TABLE I.

The evaluation of the liver function test (LFT) parameters among the study participants indicated a mean alanine aminotransferase (ALT) level of 34.11 ± 14.02 U/L and a mean aspartate aminotransferase (AST) level of 30.70 ± 9.36 U/L, a mean alkaline phosphatase (ALP) of 100.61 ± 25.10 U/L, a mean gamma-glutamyl transferase (GGT) of 43.00 ± 18.77 U/L, a mean total bilirubin of 1.01 ± 0.30 mg/dL, and average serum albumin of 4.00 ± 0.35 g/dL, as shown in Table 2, and the clinical and laboratory results of the study participants, summarized. These variables present a general liver function profile of the individuals as demonstrated in TABLE II.

DISCUSSION

In this cross-sectional investigation carried out at PMCH Hospital, a cohort of 150 adult subjects aged between 18 and 70 years was assessed through liver function tests (LFTs) to ascertain the prevalence and characteristics of hepatic abnormalities in individuals devoid of any known liver pathology. Rigorous selection criteria were employed to omit individuals presenting with active hepatobiliary disorders, chronic infections, or autoimmune diseases, thereby facilitating a more precise evaluation of baseline hepatic function within the general outpatient demographic. Most participants in our study had normal or mildly elevated enzyme levels, with alanine aminotransaminase (ALT) and aspartate aminotransaminase (AST) as the most frequently elevated enzymes. The mean levels of ALT and AST in our sample were 34.11 ± 14.02 U/L, and, 30.70 ± 9.36 U/L, respectively. In contrast, Sun et al [14]. Dose-dependent reductions in ALT were observed among participants with increasing healthy lifestyle index (HLI) scores (−5.85 IU/L for an HLI score 1; −14.15 IU/L for an HLI score 5) as compared to individuals with an HLI score of 0. In contrast, Sun et al [14]. reported that participants with higher healthy lifestyle index (HLI) scores had lower ALT levels in a dose-dependent manner, with decreases of −5.85 IU/L (HLI score 1) to −14.15 IU/L (HLI score 5) compared to those with an HLI score of 0. The AST/ALT ratio observed in our investigation conformed to the anticipated parameters for non-alcohol-related hepatic impairment, corroborating the findings of O'Shea et al. [6], wherein a ratio exceeding 2:1 is generally indicative of alcoholic liver pathology. In our findings, the AST/ALT ratio was approximately 0.9, thereby further substantiating a non-alcoholic origin for the elevations in enzyme levels. Indicators of synthetic hepatic function, such as albumin (4.00 ± 0.35 g/dL) and prothrombin time (13.30 ± 0.88 seconds), were predominantly within the normal physiological range for the majority of participants. This aligns with findings from Pratt and Kaplan [4], who reported that such markers often remain unaffected in early liver disease. Ahmed et al. [15] reported albumin values ranging from 3.3 to 3.9 g/dL across fibrosis stages, with no consistent decline until stage 4, and INR values remaining within normal limits except in cirrhosis (1.27 ± 0.06, $P < 0.0001$). ALP and GGT levels in our population averaged 100.61 ± 25.10 U/L and 43.00 ± 18.77 U/L, respectively. Sun et al. [14] did not report GGT, but elevated ALP and GGT are typically associated with cholestasis or fatty liver changes. Similar patterns were reported by Castera et al. [5] and Younossi et al. [10], and in studies by Kumar Gautam et al. [16] conducted in Northern India and Nepal. Ahmed et al. [15] highlighted that ALT was not statistically significant across all fibrosis stages, and AST was significant only at stages 3 and 4 ($P < 0.05$). Platelet count decreased significantly in advanced stages (stage 4: 151.75 vs stage 0: 228.80 $\times 10^3/\mu L$, $P < 0.0001$), whereas albumin remained nearly unchanged across most stages. The strengths of our study include defined inclusion criteria, standardized laboratory protocols, and clinical relevance to South Asian populations facing rising

metabolic risk factors. However, limitations include a single-center setting, convenience sampling, and absence of imaging or serological confirmation. Potential recall bias related to alcohol and diet may also have influenced findings, a limitation noted by Binjabr et al. [17]. Despite these limitations, the findings highlight the silent burden of liver abnormalities in ostensibly healthy individuals and emphasize the need for routine LFT screening.

CONCLUSION

It is to be concluded that mild-to-moderate elevations of transaminases and cholestatic enzymes were observed in a substantial proportion. These abnormalities correlated with obesity, diabetes, and alcohol consumption. Our findings support routine LFT monitoring to detect subclinical liver injury early, inform hospital-specific reference intervals, and guide evidence-based screening. Longitudinal studies are needed to refine intervention thresholds and improve patient outcomes.

Table I: Baseline Demographic of Study Participants (n=150)	
(Mean ± SD)	
Age in years = 53.23 ± 12.94	
Body Mass Index in kg/m^2 = 25.75 ± 3.93	
n (Percentage %)	
Gender	
Male	78 (52.0)
Female	72 (48.0)
Smoking Status	
Smoker	49 (32.7)
Non-Smoker	101 (67.3)
Alcohol	
Yes	71 (47.3)
No	79 (52.7)
Diabetes Mellitus	
Diabetic	68 (45.3)
Non-Diabetic	82 (54.7)
Hypertension	
Hypertensive	69 (46.0)
Non-Hypertensive	81 (54.0)
Hepatitis	
Yes	77 (51.3)
No	73 (48.7)
Physical Activity	
Active	47 (31.3)
Moderate	52 (34.7)
Sedentary	51 (34.0)

Table II: Assessment of Liver Function Test Parameters Among Study Participants (n=150)	
LFT Parameters	**(Mean ± SD)**
ALT in U/L	34.11 ± 14.02
AST in U/L	30.70 ± 9.36
ALP in U/L	100.61 ± 25.10

GGT in U/L	43.00 ± 18.77
Total Bilirubin in mg/dl	1.01 ± 0.30
Albumin in g/dl	4.00 ± 0.35

REFERENCES

Lala V, Zubair M, Minter D. Liver function tests. StatPearls. 2023.

Ilic K, Obradovic M, Milanovic M. Liver function tests in liver diseases. J Med Biochem. 2018;37(3):254–8.

Giannini EG, Testa R, Savarino V. Liver enzyme alteration: a guide for clinicians. CMAJ. 2005;172(3):367–79.

Pratt DS, Kaplan MM. Evaluation of abnormal liver-enzyme results in asymptomatic patients. N Engl J Med. 2000;342(17):1266–71.

Castera L, Foucher J, Bernard PH, Tournoux-Facon C, Merrouche W, Couzigou P, et al. Pitfalls of liver stiffness measurement: a 5-year prospective study of 13,369 examinations. Hepatology. 2010;51(3):828–35

O'Shea RS, Dasarathy S, McCullough AJ. Practice Guideline Committee of the American Association for the Study of Liver Diseases, Practice Parameters Committee of the American College of Gastroenterology. Alcoholic liver disease. Hepatol. 2010;51(1):307–28.

Bozkurt B, Colvin M, Cook J, Cooper LT, Deswal A, Fonarow GC, et al. Current diagnostic and treatment strategies for specific dilated cardiomyopathies: a scientific statement from the American Heart Association. Circulation. 2016;134(23): e579–646.

Wang D, Sun Z, Yang Z, Wang Z, Li H, Wu Z, et al. A modified algorithm for the diagnosis of gestational diabetes mellitus based on a prospective cohort study. BMC Pregnancy Childbirth. 2020;20(1):104.

Niemelä O, Bloigu A, Bloigu R, Aalto M, Laatikainen T. Associations between liver enzymes, lifestyle risk factors and pre-existing medical conditions in a population-based cross-sectional sample. J Clin Med. 2023;12(13):4276.

Younossi ZM, Koenig AB, Abdelatif D, Fazel Y, Henry L, Wymer M. Global epidemiology of nonalcoholic fatty liver disease: Meta-analytic assessment of prevalence, incidence, and outcomes. Hepatol. 2016;64(1):73–84.

Kalas MA, Chavez L, Leon M, Taweesedt PT, Surani S. Abnormal liver enzymes: A review for clinicians. World J Hepatol. 2021;13(11):1688.

Pratt DS, Kaplan MM. Evaluation of abnormal liver-enzyme results in asymptomatic patients. N Engl J Med. 2000;342(17):1266–71.

Lemeshow S, Hosmer DW, Klar J, Lwanga SK. Adequacy of sample size in health studies. Geneva: World Health Organization; 1990.

Sun LY, Lu TY, Jin YL, Zhang WS, Xu L. Association between lifestyle factors and liver function parameters in the middle-aged and older population. BMC Public Health. 2025;25(1):1–9.

Ahmed Z, Ahmed U, Walayat S, Ren J, Martin DK, Moole H, et al. Liver function tests in identifying patients with liver disease. Clin Exp Gastroenterol. 2018:301–7.

Kumar GA, Dewan KR, Shrestha R, KC V, Thakur AK. Clinical presentation and outcome in hospitalized patient with decompensated cirrhosis of liver in a tertiary care centre of Nepal. J Chitwan Med Coll. 2023;13(3):62–5.

Binjabr MA, Alalawi IS, Alzahrani RA, Albalawi OS, Hamzah RH, Ibrahim YS, et al. The worldwide prevalence of sleep problems among medical students by problem, country, and COVID-19 status: a systematic review, meta-analysis, and meta-regression of 109 studies involving 59427 participants. Curr Sleep Med Rep. 2023;9(3):161–79.